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color drawings. A good index closes this volume, which must prove very useful to tourist or botanist in the Canadian Rocky Mountains.

#### ORCUTT'S AMERICAN PLANTS

Few eastern botanists can realize the difficulties of the student of systematic botany in the far west, where there are no handy manuals containing the descriptions of all the flowering plants and ferns and in some cases plants of lower groups also. For some years Mr. C. R. Orcutt, of San Diego, California, has attempted to remedy this condition by bringing together the descriptions of genera and species of south Californian plants. We have often wished that his type and paper were better, but work of this kind is a labor of love, and in the absence of an endowment must be brought out at the least possible expense. It is greatly to Mr. Orcutt's credit that he has been able to bring out this book of nearly two hundred pages of descriptions, many of which occur in widely scattered publications. From the title-page we learn that the volume contains "descriptions of over 200 genera, more than 1,200 species and many varieties." A second volume is in preparation, at the close of which we are promised an index to the two volumes. This will make the work much more useful, for with no index it is well-nigh impossible to find any particular description without the expenditure of much time. When these descriptions are all brought out, they should be put together in the form of a systematic manual of the plants of southern California.

#### A HIGH-SCHOOL BOTANY

NOTICE should be made here of Coulter's text-book of botany for secondary schools recently brought out by the Appletons in the excellent type, paper and presswork which is characteristic of their publications. The plan of the book is that which has been generally followed in recent years. There is first a general part (less than one hundred pages) in which gross and microscopical anatomy are taken up by the pupil, and this is followed by chapters on algae, fungi, liverworts, mosses, ferns, horsetails and club-mosses, gymno-

sperms and angiosperms, nearly one hundred and fifty pages being given to an admirable treatment of the morphology and general classification of the plants of these groups. Then follow two chapters (20 pages) on flowers and insects, and seed dispersal, and then 61 pages on the structure and classification of monocotyledons and dicotyledons. The remainder of the book (about 40 pages) is given to little snatches of discussions of plant breeding, forestry, plant associations, hydrophytes, xerophytes and mesophytes. Some of these closing chapters could well be omitted, since the necessarily brief treatment is wholly inadequate. However, taken as a whole the book is one of the best of those adapted to use in the high schools.

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#### SPECIAL ARTICLES

##### MENDELIAN HEREDITY

ONE might suppose, at first thought, that, in cases of Mendelian heredity, the dominant form would be capable of gaining over the recessive in the course of evolution, merely from the nature of the dominance. The falsity of this view was well shown by Shull (1907) and more recently by Hardy (1908). The successful increase of a mutation depends upon aid from determinate evolution or natural selection. Here we are only concerned with the work of the latter.

Shull maintains that the view that recessiveness is a handicap is quite erroneous; "not only has the dominant form no advantage in the competition which the newly arisen elementary species must encounter, but it can be shown that under certain conditions the reverse is true." He then clearly shows that, where the new characteristic has less favorable chances of survival at the time, recessiveness is an advantage, for it may be shielded from extermination by being carried without somatic expression.

But if we assume the opposite condition, namely, that the new characteristic is more favored than the parent species, then dominance gives an advantage because the characteristic will be present in each generation,

thus permitting the work of natural selection in increasing the numbers to work without interruption.

The recessive character, on the other hand, only occasionally manifests itself, so that natural selection seldom has an opportunity to aid it. This advantage that dominance wins for the characteristic is especially important, because the early generations are the critical period for every new characteristic. Even a favored characteristic may succumb during the early days, when all the eggs are in one basket, so to speak, so numerous are the chance deaths.

Trimorphic heredity, where the heterozygotes constitute a third form different from the parents, also affects the action of natural selection. In this case the *utility of the new characteristic is less important than the utility of the heterozygous characteristic* in the determination of the fate of the characteristic in question. In some cases, the heterozygous characteristic is so different, as in the Andalusian fowl, that it is quite conceivable that the selective value of the heterozygous characteristic might be even opposed to that of the original characteristic. More frequently it would have a decreased value, whether it be negative or positive, which may reduce it to no selective value. A characteristic might have a high utility, but if its heterozygous condition lacked it, it would probably fail unless some other factor, such as assortative mating or determinate evolution, should come to its rescue. There is a possibility that the heterozygote might be favored by a selective value with the extracted characteristic neutral. It might then be successfully established by natural selection in spite of its own lack of selective value. Again the heterozygous characteristic may be favored and the extracted characteristic opposed. In that case the success of the heterozygote would be jeopardized. Rescue might come for it in the shape of a fixed heterozygous condition, such as that of the Barred Rock poultry.

The method of inheritance plays, then, a large rôle in the action of natural selection.

ROSWELL H. JOHNSON

October 11, 1908

#### THE OTTER IN MASSACHUSETTS

It is not commonly known that the North American otter (*Lutra canadensis*) is nowadays anywhere in Massachusetts a frequent victim of the trap or the gun of the hunter. It appears, however, that the otter has escaped extermination in spite of its valuable fur, and in certain sections of the state has apparently gained in numbers. The solitary habits of the animal and its shyness may have conduced to its preservation. It has, nevertheless, always been eagerly sought wherever its presence has become known, on account of the beautiful pelt, which to-day has a substantial market value.

The persecution of these valuable fur-bearing mammals, it would seem, would have led to their extinction. While their shyness and general recluse habits are in their favor, their size and certain other instinctive habits are against them. The otter seems to be a playful creature and apparently enjoys a frolic with a companion or alone. During the rutting season, perhaps at other times as well, it is known to enter into the pastime of sliding on the snow or a muddy river bank into the water of a stream or pond, and to repeat this performance many times. These otter slides are the trappers' "signs." Apparently, too, the creature may have a sort of "playground" or place where it more or less regularly leaves the water for a roll in the snow or mud.

The great traveling capability of the otter is attested by its wide distribution. It is said to be generally distributed over North America, apparently in no great abundance at any one place, but likely to be met with in localities adapted to its habits. The roaming habit, of course, in a way stands between it and destruction. In its new haunts it may live and breed for some time, undiscovered. In the old it would probably have been hunted so relentlessly that it would have been extirpated.

It is to me a matter to occasion some surprise that the otter is as abundant as records seem to show, in certain parts of this state. The otter has always been included in a list of the mammalian fauna of the state. It appears at no time to have become so deci-